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plus grand diametre tendait d'orient en occident lui paraissait à present parfaitement rond."—(*Hist. Anc. Acad. des Sciences*, vol. ii. p. 108.) In the very next year he announced definitively the spheroidal figure of the planet, and assigned to the ellipticity a value which appears to be about as good as any that has since been given.—Editor.

First Elements and Ephemeris of Polyhymnia,

Computed by Mr. George Rümker, from the following Observations :—

Paris,	Oct. 29, 1854.
Berlin,	Nov. 3,
Durham,	Nov. 9,

	°	′	″	
Mean Anomaly	36	2	51·0	1854, Nov. 10·0, G.M.T.
Perihelion	325	13	54·0	Mean Eq. 1854, Jan. 0·0
Node	13	55	38·3	
Inclination	2	27	59·1	
Angle of Eccentricity	23	46	42·9	
Log. α	0·505894			
Log. μ	2·791166			

These elements represent the middle observation with errors,—
(Calculation − Observation) + 0″·2 in Longitude, 0·0 in Latitude.

The foregoing elements were accompanied with an Ephemeris of the planet, extending from Nov. 14 to Dec. 16.

Mr. E. B. Powell writes, that in his paper on the elements of Comet II. 1854 (see *Monthly Notices*, vol. xiv. p. 221), he unfortunately, by an oversight, inserted wrong numbers for the errors of anomaly. The following are the correct numbers and the resulting elements as now furnished by him :—

$v - u = -45''$ for the error of anomaly between the 8th and 13th
$v' - u' = -11''$ — — — 8th and 18th
$v'' - u'' = +(1' - 30'')$ — — — 8th and 27th

Taking the means of the results afforded by the angles for the two latter intervals, the following elements are obtained :—

Time of Perihelion Passage	=	March 24·03468
Perihelion Distance	=	·2783
Inclination of Orbit	=	81° 44′
Longitude of Perihelion on Ecliptic...	=	170 16
Longitude of Ascending Node.........	=	316 0

Motion retrograde.

At the close of the meeting the President alluded to the curious theory which had been recently started, relative to the

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probability of a slow change continually going on in the position of *Saturn's* rings with respect to the body of the planet ; and he pointed out the advantage of examining for this purpose the early observations of the rings, similarly, as on the present occasion, Mr. Hind had done in the paper which had just been read before the Society. He also expressed the interest which he felt in the paper communicated by Mr. Williams, illustrative of some points in Chinese Astronomy, remarking that while such researches were highly creditable to their author, they could not fail, if carefully prosecuted, to be attended with advantage to astronomical science. He then stated that there were three other circumstances to which he would allude in a few words. In the first place he would remark that the results of the Greenwich observations were now published in a separate form, and might be obtained by any person upon applying for them by letter addressed to the Royal Observatory. Secondly, he wished to direct the attention of observers to the fact that, on the Monday following (Nov. 13), the planet *Saturn* would approach very near a small star. He remarked that it was highly desirable to watch such close junctures, inasmuch as the observations of them might occasionally serve to throw light on the physical constitution of the rings of the planet. There was only one recorded instance of a star having been seen in the dark space between the rings and the body of the planet, but the evidence, in support of that observation, could not, perhaps, be regarded as sufficiently worthy of confidence. The President finally adverted, in very brief terms, to the series of pendulum experiments which had been recently executed under his superintendence at Harton Colliery, near South Shields, with the view of obtaining data for ascertaining the mean density of the earth, reserving, for a future occasion, a more detailed account of the operations. He alluded to the attempt of one of his predecessors, Dr. Maskelyne, to accomplish the same object by means of experiments on the deviation of the plumb-line from the vertical direction, occasioned by the attraction of the mountain of Schehallien, in Perthshire. He also noticed the experiments for the same purpose with the torsion balance, adding, however, that he did not consider them to be sufficiently trustworthy, in consequence of the numerous disturbing influences to which operations of so delicate a nature are liable. He then adverted to the experiments with the pendulum, which his friend, Dr. Whewell, and himself had made in the years 1826 and 1828, in the bottom of Dolcoath mine, Cornwall, with the view of obtaining a solution of the same important problem. Notwithstanding several obvious disadvantages under which they laboured, they persevered in the pursuit of their object, until their labours were definitively interrupted by the flooding of the mine. He remarked that in conducting experiments of this nature, there were three essential points to be attended to.—First, there was the comparison of the two pendulums (one of which was to be used at the bottom of the mine and the other at the top) in order to ascertain their physical difference: this was satisfactorily effected by an interchange of the

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positions of the two pendulums, any difference in their rate of oscillation being thereby completely eliminated. Secondly, there was the comparison of each pendulum with its clock ; this object was attained by employing the method of coincidences originally suggested by Captain Kater. Thirdly, an accurate comparison of the clock at the bottom of the mine with the clock at the top was indispensable. This was by far the most difficult part of the operations. In the Dolcoath experiment this object was effected by the very inconvenient process of carrying chronometers from the top of the mine to the bottom along a series of ladders. The application of galvanism to astronomical observations had suggested to the President the advantage of comparing the two clocks by effecting a galvanic connexion between them. This is accordingly the method which has been practised in the Harton Colliery experiments : it would be hardly necessary to add that it was, in every respect, superior to any other mode of comparison. The President finally remarked, that until all the necessary calculations were worked out, it was impossible to ascertain the definitive result of the experiments.

Note on the Origin of the Attempts made in the seventeenth Century to derive from physical Principles an invariable Standard of Measure. By the Editor.

The only physical standards of measure, which have been applied to astronomical and other scientific purposes in modern times, are those which have been furnished by the oscillations of the pendulum and the length of an arc of the meridian. This note is accordingly confined to some remarks on the origin of these two methods.

The pendulum seems to have *first* suggested itself to scientific men as capable of furnishing a permanent standard of measure. Sprat, in his History of the Royal Society (1667), enumerating the inventions and discoveries due to one or other of the Fellows of the Society, mentions the invention of "*a universal standard or measure of magnitudes by the help of a pendulum, never before attempted.*"—(4th Edition, p. 247). In a subsequent part of the same work the author gives a special account of the labours of Dr. (afterwards Sir Christopher) Wren, in the course of which he states that the latter had shown "*that there may be produced a natural standard for measure from the pendulum for vulgar use.*"—(p. 314.)

I am not acquainted with any author who has since alluded to the labours of Wren or any other Fellow of the Royal Society in connexion with this subject. The primary idea of employing the oscillations of the pendulum to obtain a standard of measure is not generally adverted to by scientific writers. Delambre, in his Analysis of the *Horologium Oscillatorium*, pub-